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INFLUENCE OF AGRICULTURAL METHODS ON OCCURRENCE OF THE TICK HYALOMMA MARGINATUM MARGINATUM KOCH. IN REGIONS OF SHELTER BELT PLANTINGS

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This paper is a contribution from the Department of Parasitology and Medical Zoology (Managing Director Academician Ye. N. Pavlovskiy) of the Institute of Epidemiology and Microbiology imeni Honorary Academician N. E. Gamaleya (Director V. D. Timakov), Academy of Medical Sciences of the USSR.

Cultivation of the steppe disturbs the biological balance of wild life inhabiting the region. The changes brought about in this manner affect hosts harboring transmitters of infectious diseases. The activity of transmitters of endemic tick born diseases such as Omsk hemmorhagic fever and rickettsiosis is influenced by the introduction of modern agricultural methods.

From this point of view, the investigations carried out by Fedyushin (6) in the wooded steppe region of the Omsk oblast are of considerable interest. He studied the effect which methods of grass planting have on the frequency of occurrence of the ticks Dermacentor pictus Herm., and Dermacenter marginatus Sulz., of which the first is known as a transmitter of Omsk hemmorhagic fever (7) and the second of a rickettsiosis occurring in the Altay region.

By carrying out observations, over a period of 2 years, on the number of ticks occurring on virgin soil and on planted pastures, Fedyushin established that introduction of planted grassland and feed crop rotation tends to reduce the number of ticks and of natural hosts harboring them. This is due not only to the mechanical effect on satiated stages of the tick lying in the soil, but also to the fact that periodic plowing changes the microclimate, thus affecting unfavorably the changes of the tick's survival during the winter. Planted pastures have an unfavorable effect on ticks even at the very end of the period of normal economic utilization (i.e., at the expiration of 5 years) with the result that the tick population found on them is less numerous than on natural pastures.

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Data referring to the Southern Ukraine (1) shows that the number of species and the extent of the population of animals and birds are much higher on reservations, pastures, and land which has lain fallow for 7-8 years as compared with land occupied by grain crops. In view of the fact that birds and animals harbor ticks, this finding is of importance.

Our studies refer to the tick Hyalomma marginatum marginatum Koch. (transmitter of Crimean hemmorhagic fever) which inhabits the steppes of the Krasnodar territory. We first investigated a 19,000-hectare farm planted under grain and having a thick network of forest shelter belts 13 to 15 years old. The forest shelter belts were more than 6 meters wide had interlocking tree crowns, and were devoid of grass growth. Fallow land, and natural and old pastures were absent.

Examination of 143 cows on this farm and in the vicinity showed a very low occurrence of H. m. marginatum, which is the typical representative of Ixodes ticks in that region. Hares and birds (this includes domestic fowl) nesting on the soil and feeding in the grass are known to be hosts harboring pupae and larvae of this two-host species (4). The number of winter hares was found to be much reduced in this area, and a specimen which had been shot was found to be free of ticks. Among 71 specimens of birds (18 species) no infestation with ticks was found.

For purposes of comparison, a steppe region 90-100 km distant from the first location was investigated. This region had many stretches of fallow land and old pastures. Artificial forest plantings were weakly represented, and those which existed had thinned out and were encroached upon by the steppe. Examination of 90 cows disclosed that they had twice the number of ticks found on cows in the original location. Twenty one specimens of birds were examined and infestation with up to 45 ticks per single bird was found in the case of larks; 21.3% of the birds were infested, and the average number of ticks per bird was 20.

On the basis of these results, it appears that the planting of forest shelter belts would tend to check a significant increase in the number of H. m. marginatum. The number of winter hares is reduced by such plantings due to the lack of grass cover in the forests, and this also applies to steppe birds which seek their food in the grass. The latter would be replaced by forest birds. As has been mentioned above, winter hares and steppe birds function as hosts and transmitters of the ticks.

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